Miguel Jiménez

Curriculum Vitae[1]

Computer Science Department
University of Victoria
Victoria, Canada
ES, EN, FR (elementary)

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https://migueljimenez.co
https://github.com/jachinte

Research Interests

My area of research is Software Engineering with a focus on the design and development of self-adaptive software systems. My research interests include software engineering, self-adaptive systems, models at run-time and domain specific languages. I am currently working on automated software evolution of cloud systems through quality-driven continuous experimentation.

Education

2016-Present **Ph.D. Candidate in Computer Science** - University of Victoria, Canada

GPA 3.85/4
Advised by Drs. Hausi Müller and Gabriel Tamura
Thesis topic: Continuous software evolution at run-time

2014-2016 **M.Sc. in Software Engineering** - Universidad Icesi, Colombia

GPA 3.87/4
Advised by Dr. Gabriel Tamura
Thesis (English): A framework for generating and deploying dynamic performance monitors...
Thesis (Español): Framework para generación y despliegue de monitores dinámicos de rendimiento...

2009-2014 **B.E. in Systems Engineering** - Universidad Icesi, Colombia

GPA 3.21/4 • Engineering Dean's list in semesters VI, VII, VIII and IX
Advised by Angela Villota-Gomez and Dr. Gabriel Tamura
Degree project: PaSCAni: A language for run-time V&V of functional requirements (Spanish)

Continuing Education

Machine Learning and IoT Foundations (Badge). IBM. May 2019

Software Engineering Lifecycle of IoT Systems. NSERC CREATE DITA Program. May 2019

Entrepreneurship Laboratory with Mobile Technologies. MIT AITI - Colombia. Summer 2012

Awards and Honors

2019 **Runner-up for CAS Project of the Year (5 among 70+ projects)**, IBM

2019 **Runner-up for CAS Student of the Year (8 among 120+ graduate students)**, IBM

2019 🏆 **New Ideas and Emerging Research Paper Award**, CASCON x EVOKE

2019 🏆 **First place in the DITA Hackathon (announcement)**, IBM Canada and York University

2019 🏆 **Best Poster Presentation**, SEMLA and CSER joint poster session

2018, 2019 **Travel Scholarship**, CRA-URMD Grad Cohort

2017-2019 **UVic Graduate Award**, University of Victoria

2017 **Howard E. Petch Research Scholarship**, University of Victoria

[1] This curriculum vitae was last updated on July 1, 2020. Download the latest version from migueljimenez.co/cv.pdf

2017-2019 **IBM Advanced Studies Grant**, IBM

2017 🏆 **Cleanest Code at HackUVic (submission)**, UVic Development Club (awarded by local company)

2016 **Doctoral Fellowship (full tuition scholarship)**, University of Victoria

2014 **Master's Degree Fellowship (full tuition scholarship)**, Universidad Icesi

2014-2016 **Young Researcher Fellowship**, Colombian Department of Science, Technology, and Innovation

2014 **Student Loan Waiver (100%)**, Colombian Institute of Educational Credit and Technical Studies

2013 🏆 **Top ECAES Exam (results)**, Colombian Institute for the Promotion of Higher Education

2009 **Bachelor's Degree Scholarship (25% tuition)**, Universidad Icesi

2011-2014 **Engineering Dean's list in semesters VI, VII, VIII, & IX**, Universidad Icesi

Research Experience

Jan 2018 - Present ***Graduate Research Assistant***
IBM Advanced Studies + Rigi Research Group, University of Victoria, Canada
Advised by Dr. Hausi Müller, Dr. Gabriel Tamura and Joe Wigglesworth (IBM)

- Filed an invention disclosure (in revision).
- Published 9 academic papers so far.
- Participate in the following industry collaborative projects as a lead student, occasionally visiting the IBM Toronto Lab to identify and validate research challenges.

Reverse Engineering Deployment Specifications from Running Systems
In collaboration with IBM (ongoing)

- Study feasible solutions to assist organizations in migrating from ad-hoc infrastructure management to Infrastructure-as-Code (IaC) using Terraform. This includes the design of a reverse engineering mechanism to introspect deployed infrastructures and to generate the representative deployment specification.
- Evaluate integration scenarios for IBM Cloud Automation Manager and VMware vSphere with round-trip engineering mechanisms for Terraform templates.
- Implemented a proof of concept middleware to support the automated evolution of IaC specifications based on run-time adaptations to the subject infrastructure.
- Proposed an architectural framework for quality-driven and adaptive continuous experimentation. This proposal allows managing systems to plan and conduct experiments concerning the software architecture and the system infrastructure.

Cognitive IoT Recipe Maven
In collaboration with IBM

- Participated in the design and development of a conversational agent for the smart kitchen based on integrated user, fridge and grocery store contexts.
- Implemented proof-of-concept applications, including a web application for a smart recipe recommender and an Android application for the management of dietary restrictions.

Jan 2014 - Aug 2016 ***Graduate Research Assistant***
i2T/DRISO Research Group, Universidad Icesi, Colombia
Advised by Dr. Gabriel Tamura

- Published 3 academic papers.
- Participated in the following industry collaborative projects as a young researcher:

Processing of Large and Complex XML Documents
In collaboration with Carvajal T&S

- Created Amelia, a domain-specific language to automate the configuration and deployment of more than 300 experimental trials. The language addressed the following challenges: variability in architectural configurations, dependency management, coordination control, modularity and composability, reusability and extensibility.
- Created PaSCAni, a domain-specific language to specify, generate and deploy performance monitors to introspect service-oriented applications at run-time.

Context-Driven Route Optimization: A Home-Health Case
In collaboration with Carvajal T&S

- Participated in technology transfer activities to adapt the asymmetric traveling salesman problem with time windows (ATSP-TW) to Carvajal's home-health product.
- Implemented a test case generator for the ATSP-TW. The generator uses a uniform distribution to randomly select values from categorical variables. It then creates matrix files input to the ATSP-TW algorithm.
- Compared and characterized major providers of map libraries and APIs and selected the most adequate based on numerical criteria.
- Investigated and characterized Java libraries to solve the traveling salesman problem.

Jun 2013 - Dec 2013 ***Research Assistant Intern***
i2T/DRISO Research Group, Universidad Icesi, Colombia
Advised by Dr. Gabriel Tamura

Proposed and implemented various component-based strategies for the matrix chain multiplication problem and conducted quantitative experiments to test their scalability.

Spring 2012 ***Undergraduate Research Assistant***
i2T/DRISO Research Group, Universidad Icesi, Colombia
Advised by Lorena Castaneda

Learned about Service Component Architecture and migrated a MAPEK loop implementation from Apache Tuscany to FraSCAti.

Industry Experience

2020 ***Software Engineer Intern***
SAP, Montreal, Canada

2015 ***Freelance Software Developer***
Carvajal Espacios S.A.S., Cali, Colombia

- Developed a Java web application using Play! framework for the purchasing department to manage raw material catalogs and suppliers as well as material search statistics. As part of the development, designed the database relations and integrated the charting library Highcharts into the application.
- Led meetings with the customer to elicit the software requirements, and coordinated with the IT team to integrate an existing LDAP server and to deploy the application to the customer's infrastructure.
- Effectively planned and coordinated development tasks and meetings with the customer.

2015 ***Freelance Software Developer***
Laboratorios LaFrancol S.A.S., Cali, Colombia

- Developed a web application for the purchasing department to create online auctions and invite partner suppliers to bid.
- Implemented a NodeJS server to handle live bids through WebSockets and an ASP.NET MVC web app using the Entity Framework.
- Led meetings with the customer for requirements elicitation and training sessions with the target users.

2012 ***Freelance Software Developer***
SQL Soluciones Informaticas S.A.S., Cali, Colombia

- Advised the customer on hardware and software purchasing and technical decision making.
- Developed an information system for a premier trolley service for ticket management, printing and selling. Implemented the system using ASP.NET MVC and Entity Framework.

2009-2010 ***Software Developer***
SQL Soluciones Informaticas S.A.S., Cali, Colombia

- Deployed and managed the corporate website, customer support portal, and online store using Joomla! and Magento.
- Developed a PHP content management site for documentation and video tutorials, increasing customer satisfaction and supporting a market expansion. Recorded and edited more than 90 training videos.
- Designed advertisement for digital and print marketing campaigns.

Teaching and Mentoring Experience

2016-2018 ***Lead Graduate Teaching Assistant***
Fundamentals of Programming with Engineering Applications (CSC 111), University of Victoria
Instructor: Dr. Hausi Müller

- Lectured weekly labs and assisted students with programming and lab assignments
- Co-led weekly meetings and developed teaching material and quizzes
- Developed grade-buddy, a program to assist teaching assistants and professors in automating the marking of programming assignments
- Developed a multi-platform installation assistant to ease the installation of CLion and its dependencies on Windows, Mac and Linux
- Developed examgen, a program to generate examinations along with their solutions from a YAML input file. The resulting files are rendered to either LaTeX or Moodle. By creating examgen, we stopped printing **2800** quizzes and reduced marking time by **30h** per term
- Deployed and managed an online platform to host and mark programming assignments

Spring 2018 ***Graduate Teaching Assistant***
Assistance Centre in Computer Science, University of Victoria

Tutored students and assisted them with programming assignments in one-on-one sessions for 1st, 2nd and 3rd year courses.

Fall 2016 ***Graduate Teaching Assistant***
Data Structures I (CSC 225), University of Victoria
Instructor: Dr. Ulrike Stege

- Lectured weekly labs and assisted students with lab assignments.
- Developed scripts to mark programming assignments.

2015 ***Technical Advisor***
Undergraduate degree project, Interactive Media Design Program - Universidad Icesi

Project: Knowledge management and dissemination: alternative soccer culture
Student: Juan David Flórez Bautista

2014 ***Undergraduate Degree Project Supervisor***
Undergraduate degree project, Interactive Media Design Program - Universidad Icesi

Project: Folii: natural and interactive encyclopedia mediated by citizen science
Students: Juan Pablo Pérez, Mauricio Alberto Toro

2014 ***Undergraduate Degree Project Co-Supervisor***
Undergraduate degree project, Interactive Media Design Program - Universidad Icesi

Project: An information system for bicycle transportation
Student: Claudia Ximena Barriga

Spring 2011 ***Undergraduate Teaching Assistant***
Data Structures and Algorithms, Universidad Icesi
Instructor: Angela Villota-Gomez

Graded assignments and assisted students during weekly labs.

Publications

Refereed Journal Articles

[J.1] Ilias Gerostathopoulos, Marco Konersmann, Stephan Krusche, David I. Mattos, Jan Bosch, Tomas Bures, Brian Fitzgerald, Michael Goedicke, Henry Muccini, Helena H. Olsson, Thomas Brand, Robert Chatley, Nikolaos Diamantopoulos, Arik Friedman, **Miguel Jiménez**, Jan Ole Johanssen, Putra Manggala, Masumi Koseki1, Jorge Melegati, Nuthan Munaiah, Gabriel Tamura, Vasileios Theodorou, Jeffrey Wong, and Iris Figalist. "Continuous Data-driven Software Engineering – Towards a Research Agenda. Report on the Joint 5th International Workshop on Rapid Continuous Software Engineering (RCoSE 2019) and 1st International Workshop on Data-Driven Decisions, Experimentation and Evolution (DDrEE 2019)". In: *ACM SIGSOFT Software Engineering Notes* (Aug. 2019).

[J.2] Hugo Arboleda, Andrés Paz, **Miguel Jiménez**, and Gabriel Tamura. "Development and Instrumentation of a Framework for the Generation and Management of Self-Adaptive Enterprise Applications". en. In: *Ingeniería y Universidad* 20 (Dec. 2016), pp. 303–333. *Rank: Q3 SJR: 0.161*.

Refereed Conference Proceedings

[C.1] Luis F. Rivera, **Miguel Jiménez**, Prashanti Angara, Norha M. Villegas, Gabriel Tamura, and Hausi A. Müller. "Towards Continuous Surveillance and Personalized Medical Treatments in Precision Medicine Through Digital Twins". In: *Proceedings of the 29th Annual International Conference on Computer Science and Software Engineering (CASCON)*. IBM, 2019. *Rank: B1 (Qualis) Acceptance rate: 33%*.

[C.2] Luis F. Rivera, Norha M. Villegas, Gabriel Tamura, **Miguel Jiménez**, and Hausi A. Müller. "UML-driven Automated Software Deployment". In: *Proceedings of the 28th Annual International Conference on Computer Science and Software Engineering (CASCON)*. IBM, 2018, pp. 257–268. *Rank: B1 (Qualis) Acceptance rate: 27%*.

[C.3] Prashanti Angara, **Miguel Jiménez**, Kirti Agarwal, Harshit Jain, Roshni Jain, Ulrike Stege, Sudhakar Ganti, Hausi A. Müller, and Joanna W. Ng. "Foodie Fooderson a Conversational Agent for the Smart Kitchen". In: *Proceedings of the 27th Annual International Conference on Computer Science and Software Engineering (CASCON)*. IBM, 2017, pp. 247–253. *Rank: B1 (Qualis) Acceptance rate: 27%*.

[C.4] **Miguel Jiménez**, Norha M. Villegas, Gabriel Tamura, and Hausi A. Müller. "Deployment Specification Challenges in the Context of Large Scale Systems". In: *Proceedings of the 27th Annual International Conference on Computer Science and Software Engineering (CASCON)*. IBM, 2017, pp. 220–226. *Rank: B1 (Qualis) Acceptance rate: 27%*.

[C.5] Hugo Arboleda, Andrés Paz, **Miguel Jiménez**, and Gabriel Tamura. "A framework for the generation and management of self-adaptive enterprise applications". In: *2015 10th Computing Colombian Conference (10CCC)*. 2015, pp. 55–62. *SJR: 0.114*.

Refereed Workshop Proceedings

[W.1] Luis F. Rivera, Hausi A. Müller, Norha M. Villegas, Gabriel Tamura, and **Miguel Jiménez**. "On the Engineering of IoT-Intensive Digital Twin Software Systems". In: *Proceedings of the IEEE/ACM 42nd International Conference on Software Engineering Workshops (ICSEW)*. Seoul, Republic of Korea: ACM, 2020, In press.

[W.2] Jean-Michel Bruel and **Miguel Jiménez**. "DevOps'18 Education Panel". In: *Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment*. Ed. by Jean-Michel Bruel, Manuel Mazzara, and Bertrand Meyer. Springer, 2019, pp. 221–226.

[W.3] **Miguel Jiménez**, Lorena Castaneda, Norha M. Villegas, Gabriel Tamura, Hausi A. Müller, and Joe Wigglesworth. "DevOps Round-Trip Engineering: Traceability from Dev to Ops and Back Again". In: *Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment*. Ed. by Jean-Michel Bruel, Manuel Mazzara, and Bertrand Meyer. Springer, 2019, pp. 73–88.

[W.4] **Miguel Jiménez**, Luis F. Rivera, Norha M. Villegas, Gabriel Tamura, Hausi A. Müller, and Nelly Bencomo. "An Architectural Framework for Quality-driven Adaptive Continuous Experimentation". In: *Proceedings of the Joint 4th International Workshop on Rapid Continuous Software Engineering and 1st International Workshop on Data-Driven Decisions, Experimentation and Evolution (RCoSE/DDrEE)*. IEEE, 2019, pp. 20–23.

[W.5] **Miguel Jiménez**, Luis F. Rivera, Norha M. Villegas, Gabriel Tamura, Hausi A. Müller, and Pilar Gallego. "DevOps' Shift-Left in Practice: An Industrial Case of Application". In: *Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment*. Ed. by Jean-Michel Bruel, Manuel Mazzara, and Bertrand Meyer. Springer, 2019, pp. 205–220.

[W.6] **Miguel A. Jiménez**, Ángela V. Gómez, Norha M. Villegas, Gabriel Tamura, and Laurence Duchien. "A Framework for Automated and Composable Testing of Component-Based Services". In: *2014 IEEE 8th International Symposium on the Maintenance and Evolution of Service-Oriented and Cloud-Based Systems (MESOCA)*. 2014, pp. 1–10.

Book Chapters

[B.1] **Miguel Jiménez** and Gabriel Tamura. "Framework para generación y despliegue de monitores dinámicos de rendimiento en sistemas software autoadaptativos". In: *Bitácoras de la maestría*. Vol. 3. Editorial Universidad Icesi, 2020. Chap. 1, 25–108. In press.

Contributed Talks and Posters

[P.1] **Miguel Jiménez**, Hausi Müller, Gabriel Tamura, Joe Wigglesworth, Ian Watts, and Hugh Hockett. *A Middleware for Continuous Evolution at Run-time*. Poster at the 29th Annual International Conference on Computer Science and Software Engineering (CASCON), Markham, ON, Canada. Oct. 2019.

[P.2] **Miguel Jiménez**, Gabriel Tamura, and Hausi Müller. *Towards Software Engineering at Run-time Through Continuous Experimentation and Evolution*. Poster at 2019 CRA Grad Cohort Workshop for Underrepresented Minorities + Persons with Disabilities (CRA URMD), Waikoloa Village, Hawaii, United States. Mar. 2019.

[P.3] **Miguel Jiménez**, Gabriel Tamura, Hausi Müller, Joe Wigglesworth, and Ian Watts. *Model Transformation Issues for Round-trip Engineering of Deployment Specifications*. Poster at Joint Consortium for Software Engineering Research 2019 Spring Meeting (CSER) and 2nd Software Engineering for Machine Learning Applications (SEMLA), Montréal, Québec, Canada. May 2019.

[P.4] **Miguel Jiménez**, Gabriel Tamura, and Hausi Müller. *Continuous Deployment Specification for Large-Scale Systems*. Poster at the 28th Annual International Conference on Computer Science and Software Engineering (CASCON), Markham, ON, Canada. Oct. 2018.

[P.5] **Miguel Jiménez**, Norha M. Villegas, Gabriel Tamura, and Hausi Müller. *Round-trip Software Engineering in DevOps: Making the Infrastructure a Code Committer*. Poster at 2018 CRA Grad Cohort Workshop for Underrepresented Minorities + Persons with Disabilities (CRA URMD), San Diego, California, United States. Mar. 2018.

[P.6] **Miguel Jiménez**, Norha M. Villegas, Gabriel Tamura, Hausi Müller, Joe Wigglesworth, and Ian Watts. *DevOps Round-trip Software Engineering: On Traceability from Dev to Ops and back*. Talk at the Consortium for Software Engineering Research (CSER), Markham, ON, Canada. May 2018.

[P.7] **Miguel Jiménez**, Prashanti Angara, Harshit Jain, Kirti Agarwal, Roshni Jain, Hausi Müller, Ulrike Stege, and Joanna Ng. *Cognitive IoT Recipe Maven: Digital Expertise in the Kitchen*. Poster at Centre for Advanced Studies Technical Link Event (CASTLE), Markham, ON, Canada. May 2017.

[P.8] **Miguel Jiménez**, Hausi Müller, and Gabriel Tamura. *A DSL Approach For Dynamic Performance Monitoring and Deployment*. Petcha Kutcha presentation at the Consortium for Software Engineering Research (CSER), Markham, ON, Canada. Oct. 2016.

[P.9] **Miguel Jiménez**, Hausi Müller, and Gabriel Tamura. *A DSL Approach For Generating and Deploying Dynamic Performance Monitors for Self-Adaptive Software Systems*. Poster at the 26th Annual International Conference on Computer Science and Software Engineering (CASCON), Markham, ON, Canada. Oct. 2016.

Invited Talks

[T.1] **Miguel Jiménez**. *Continuous Software Engineering Practices (Spanish)*. Guest speaker for the Software Engineering course, Universidad Icesi. Feb. 2020.

[T.2] **Miguel Jiménez**. *Continuous Software Engineering Practices (Spanish)*. Guest speaker for the Software Engineering course, Universidad Icesi. Aug. 2019.

[T.3] **Miguel Jiménez**. *Continuous Value Delivery with DevOps (Spanish)*. Online webinar for university alumni, Universidad Icesi. Mar. 2019.

[T.4] **Miguel Jiménez**, Hausi Müller, Gabriel Tamura, Joe Wigglesworth, Ian Watts, and Hugh Hockett. *Adoption and Evolution of Infrastructure-as-Code in Hybrid Clouds*. Presentation at the 11nd Workshop on Cloud Computing, Annual International Conference on Computer Science and Software Engineering (CASCON). Markham, Canada. Oct. 2019.

[T.5] **Miguel Jiménez**, Hausi Müller, Gabriel Tamura, Joe Wigglesworth, Ian Watts, and Hugh Hockett. *Adoption and Evolution of Infrastructure-as-Code in Hybrid Clouds*. 11th CASCON Workshop on Cloud Computing. Oct. 2019.

[T.6] **Miguel Jiménez**, Gabriel Tamura, and Hausi Müller. *Towards Continuous Assurance of Non-Functional Requirements Through Continuous Experimentation*. Presentation at the 2nd Workshop on DevOps and Software Analytics for Continuous Engineering and Improvement, Annual International Conference on Computer Science and Software Engineering (CASCON). Markham, Canada. Nov. 2018.

Press

[M.1] Colombian Institute of Educational Credit and Technical Studies Abroad. *Los desafios profesionales de hoy para el mundo (Today's professional challenges for the world)*. Invited as a case of success story. July 2020.

Industry Collaborative Projects

2018 - Present
Reverse Engineering Deployment Specifications from Running Systems
CAS Fellowship Project. IBM + University of Victoria, Canada

Role: Lead Student
Joe Wigglesworth (Lead Contributor), Hausi Müller (Principal Investigator)

This project is concerned with the design of reverse engineering techniques to introspect deployed infrastructures and the generation of the representative deployment and configuration specifications.

2017
Cognitive IoT Recipe Maven
CAS Fellowship Project. IBM + University of Victoria, Canada

Role: Lead Student
Joanna Ng (Lead Contributor), Hausi Müller (Principal Investigator)

This project aimed to develop software applications to exploit digital expertise in the modern kitchen based on integrated user, fridge and grocery store contexts.

2015 - 2016
Context-Driven Route Optimization: A Home-Health Case
Technological Innovation Project. Colciencias + Carvajal T&S, Colombia

Role: Young Researcher
Diana Gonzalez and Oscar Mancipe (Lead Contributors), Gabriel Tamura (Principal Investigator)

This project aimed to optimize the route planning of a management software for home health.

2014 - 2015 ***Processing of Large and Complex XML Documents***
Technological Innovation Project. Colciencias + Carvajal T&S, Colombia

Role: Young Researcher
Pilar Gallego (Lead Contributor), Gabriel Tamura (Principal Investigator)

This project aimed to improve a reference architecture of a product family for the processing of large data volumes.

Skills

The following is a list of selected skills.

- **Technical Skills**

  Architecture Design
  Containerized Applications
  Continuous Delivery
  Infrastructure Provision
  Infrastructure as Code
  Machine Learning
  Language Engineering
  Object Oriented Programming
  Performance Monitoring
  Service Component Architecture
  Software Deployment
  Web programming

- **Programming Languages**

  Java, Xtend
  JavaScript, CSS, HTML
  C
  Python
  Go
  C#
  Oz
  ShellScript

Service and Volunteering

Fall 2019 ***Session Chair***
Annual International Conference on Computer Science and Software Engineering, Canada

Fall 2019 ***Social Media Co-Chair***
Consortium for Software Engineering Research (CSER) Fall Meeting, Canada

2011-2012 ***Volunteer instructor for the Web Programming Club***
Universidad Icesi, Cali, Colombia

Developed teaching material and lectured students of the Systems Engineering and Interactive Media Design programs on HTML, CSS and JavaScript.

Spring 2007 ***Volunteer for the Families in Action program (Familias en Acción)***
Colombian Government – Department of Social Prosperity, Colombia

Assisted women heads of household from vulnerable populations to register in the program and update their family information.

References

Dr. Hausi Müller (hausi@uvic.ca)
Associate Professor and Dean of Research
Department of Computer Science, University of Victoria

Dr. Gabriel Tamura (gtamura@icesi.edu.co)
Associate Professor
Department of ICT, Universidad Icesi

Dr. Lorena Castaneda (lcastane@gmail.com)
Software Developer
CityView

Dr. Norha M. Villegas (nvillega@icesi.edu.co)
Director of the Software Systems Engineering Professional Program
Department of ICT, Universidad Icesi